Patent
Attorney Docket No. 0329-0009.01

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

Ulrich Müller, et al.

Serial No.

10/677,880

Filed

October 2, 2003

Examiner

Vikram Bali

Title

FLATNESS MEASUREMENT SYSTEM

FOR METAL STRIP

APPEAL BRIEF

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(1) Real Party in Interest

The real parties in interest in this appeal are Thyssen/Krupp Stahl AG and Betriebsforschungsinstitut (BFI) VDEH-Institut fur Angewandte Forschung GMBH, assignees of the invention claimed in the above referenced application, which assignments were recorded in the United States Patent and Trademark Office at Reel No. 017336 and Frame No. 0313 and Reel No. 017336 and Frame 0299, respectively, on March 21, 2006.

(2) Related Appeals and Interferences

An Appeal (Appeal No. 2503-11141) in the parent application, Serial No. 09/034,481 was previously filed on December 19, 2001. Appellants' Brief was filed on July 18, 2002 and an Examiner's Answer was mailed on September 24, 2002. No Oral Hearing was requested. Applicants voluntarily withdrew the Appeal on October 3, 2003 (before consideration by the Board) in favor of this continuation application which was filed on October 2, 2003.

(3) Status of Claims

Applicant is appealing the rejection of pending claims 8-15.

(4) STATUS OF AMENDMENTS

On April 20, 2005, a Response was filed to the Final Office Action of October 20, 2004. This Response did not modify or amend the pending claims. Thus, the pending claims are the claims submitted with Appellants Second Preliminary Amendment filed on October 27, 2003.

(5) SUMMARY OF THE CLAIMED SUBJECT MATTER

The present invention is generally directed to a system that measures the flatness of a moving hot metal strip (Claims 8-10 and 14) or the end face of a coil (Claims 11-13 and 15), and controls the processing of the same. The system described and claimed provides for improved strip and/or coil quality by measuring and identifying deviations in the flatness of the strip or end face. Based on such measurements, the system can control the finishing parameters by evaluating a line pattern on the strip surface or on the end face of the coil as the strip is coiled.

Typically, in the field of hot metal forming, hot strips of metal are conveyed from a starting point where the metal is formed into a strip, to an end point where the strip is coiled (Fig. 4, paragraph 0035). In systems of the type used in the present invention, the temperature of the strip is often in the neighborhood of 1000°C or higher (Paragraph

0002). Producing a flat strip is important for many end uses of the metal.

In the hot metal strip production process, a cast hot metal strip is passed through finishing rolls (6) and a strip cooling line (8) to a coiler (7) (Fig. 4). In the run-out from the finish rolls, the flatness of the hot strip is detected, analyzed and evaluated (Fig. 4, paragraph 0035). A CCD camera (5) is located on the side of the system nearer to the coiler (Fig. 3, paragraph 0033). A projector (3) is located on the side of the system remote from the coiler (Paragraph 0030). In other words, the camera (5) and the projector (3) are arranged in succession relative to the direction of travel of the strip (Paragraph 0031). A line pattern is projected, for example, through a slide, onto the surface of the moving strip or on the end face of the coil (Paragraph 0031). Unevenness (defects in the flatness) on the strip surface or end face will cause the projected line pattern to follow an irregular course (Paragraph 0032). The shape of the line pattern is detected by the camera which can resolve the line pattern, and the measurement data obtained is compared with a reference measurement (Paragraph 0033). A processor (computer) converts the measurements into central parameters for the finishing train and coiler (Paragraph 0021).

(6) <u>Issues</u>

(A) Whether claims 8-15 would have been obvious under 35 U.S.C. §103(a) over U.S. Patent No. 5,367,378 to <u>Harding et al.</u> in view of the article "A Non-Contact System for Measuring Hot Strip Flatness" by <u>Pirlet et al.</u>

(B) Whether claims 11-13 and 15 would have been obvious under 35 USC 103(a) over U.S. Patent No. 5,367,376 to <u>Harding et al.</u> in View of the Article "A Non-contact System for Measuring Hot Strip Flatness" by <u>Pirlet et al</u>

(7) <u>Argument</u>

A. Claims 8-15 Would Not Have Been Obvious Because One of Ordinary Skill Would Not Have Been Motivated to Combine the Teachings of Pirlet et al. with those of Harding et al.

In the Office Action of October 20, 2004, the Patent Office rejected claims 8-15 under 35 USC §103 as being unpatentable over U.S. Patent No. 5,367,378 to <u>Harding et al.</u> in view of the article by <u>Pirlet et al.</u> Specifically, it is the Examiner's position that although <u>Harding et al.</u> does not disclose a hot metal strip, it would have been obvious for one of ordinary skill in the art to introduce the method of measuring the shape of a hot metal strip, as taught by <u>Pirlet et al.</u>, in a non-contact system for measuring the hot strip flatness, as both of these two references are "solving the

same problem of measuring the metal strip (Office Action, page 3)."

As discussed above, Claims 8-10 and 14 are directed to a method of continuously measuring the flatness of a moving hot metal strip. Claims 11-13 and 15 are directed to a method for continuously measuring the flatness of an end face of a coil when coiling a metal strip. The Office rejected Claims 11-13 and 15 "as claims 8-10 and 14, because claims 11-13 and 15 are claiming similar subject matter as Claims 8-10 and 14 respectively" (Office Action, p.4). Accordingly, in this section of the Brief, Applicants address the rejection of all of the Claims 8-15 together based on the Examiner's combination of Harding et al. and Pirlet. In addition, Applicants address the rejection as it further applies to Claim 11-13 and 15 in the following section of the Brief.

Applicants respectfully traverse the Examiner's rejection and submit that, in fact, it would not have been obvious to introduce the moving hot metal strip into the system of Harding et al. in order to measure the flatness of the metal strip. The two systems represented by the Harding et al. patent on the one hand, and the article by Pirlet et al., on the other hand, represent two fundamentally different systems. Applicants respectfully submit that because of the nature and the characteristics of the hot metal strip being

processed in, for example, Pirlet, (or Applicant's system), one of ordinary skill in the art would not have been led to the Harding et al. reference.

In response to the Office Action of October 24, 2004, Applicants submitted the Declaration of Dr. Ulrich Müller, a named inventor in the present application and an individual of skill in the art, with an understanding of rolling mill control systems and the challenges presented thereby. Dr. Müller's Declaration is provided in the Evidence Appendix to this Appeal Brief. In his Declaration, Dr. Müller explains why one of skill would not have considered Harding et al. relevant to the problem of measuring the flatness of a hot metal strip.

First, the teaching of Harding et al. is not relevant to the problem of having to measure the flatness of a moving, extremely hot metal strip. That is because unlike the reflective surface in Harding et al., the surface of the metal strip is typically not reflective but, in fact, is hot red/orange in its appearance, as shown in the photograph of Applicant's system attached to the Müller Declaration. Because of the intense, non-reflective color of the moving hot metal strip, one of ordinary skill would not have considered it possible to effectively project line patterns

onto the strip and measure the line patterns (Müller Declaration, paragraph 6).

Line patterns are based on the idea of projecting an original picture (using a grid as in Harding et al. or through a slide) onto a surface by shining light through the original and thereby creating illuminated areas and non-illuminated areas on the surface (i.e., the line pattern). The shape of the thus created lines is used to analyze the condition of the surface. For this analysis, it is, however, crucial that the line-borders are clearly detectable by the camera and that any distortion to the line-border is the result of surface-deficiencies only. Distortions to the line borders that stem from other causes would make the system ineffective (Müller Declaration, paragraph 6).

Second, as pointed out by Dr. Müller, because the metal strip being measured is, in fact, hot, and unlike Harding et al., not reflective, projecting and evaluating the line patterns on the hot metal strip would not have been something that one of ordinary skill in the art would have thought possible. A person of ordinary skill would not have believed that such a projection of a line pattern onto a hot metal strip would work, as the red-glowing metal strip itself emits light. This leads to the situation where the areas not illuminated by the light coming from the grid (that is the

area that is supposed to be dark in order to create the necessary line border) are not dark but glowing bright red. As noted by Dr. Müller, one of ordinary skill would not have expected that the light-gradient between the illuminated and non-illuminated areas would be significant enough to make out a clear line-border. Thus, one of skill, would not have expected that such a system could work reliably with a red-glowing, hot metal strip. On the contrary, one of skill would have expected that the crucial light-gradient would only be made possible by high powered lasers, like the one disclosed in, for example, the previously cited U.S. Patent No. 5,488,478 to Bullock et al. or in the Pirlet article (Müller Declaration, paragraph 7). Indeed, based on the foregoing, Applicants respectfully submit that to suggest that Harding would have led one of skill to the present invention is to employ the impermissible "obvious to try" approach to obviousness.

Third, because metal strips contain many irregularities, which appear as random darkened areas on the surface of the strip, projecting a line pattern of the type used in Harding et al. would have been considered difficult by one of ordinary skill. These darker areas are the result of differences in temperatures in areas of the metal strip as it leaves the finishing-stand (Müller Declaration, paragraph 8).

Fourth, while the Examiner has indicated that it would have been obvious to employ a moving system into the stationary system disclosed in Harding et al., in fact, there are several reasons why this is not the case. As pointed out in the attached Declaration of Dr. Müller, measurement of a reflective surface as described in Harding et al. requires that the object be stationary and, therefore, would have led one away from using such a system on a moving strip. The problem with systems that work on reflective surfaces, as described in Harding et al. is that they rely on the fact that the panel being measured is itself always in one definite position relative to the grid and the camera. The image of the projected grid can only be seen, if the camera is situated in a very specific position, as shown in "Scenario A" of the sketches attached to the Declaration of Dr. Müller. This is due to the fact that with reflective surfaces, the incident angle of light is the same as the angle of reflection. If the complete panel to be analyzed is not in the assumed position, the camera will analyze a reflection that differs significantly from the reflection that comes off a panel in the assumed position. This difference in picture does not, however, stem from surface defects but simply from a shifted panel. Thus, even with panels without surface defects, the system would consider the

perfect panel to be faulty, because it is seeing an unexpected picture, as depicted in the "Scenario B" and "Scenario C" in the sketch attached to the Müller Declaration.

Moreover, looking at the "Scenario A1" and "Scenario B2" of the further attached sketches, it is also demonstrated, that a slight tilting of the panel can also lead to scenarios where the system would not work. When one takes into account the fact that the strip may be vibrating as it leaves the finishing stand, clearly one would not have considered a system that only works with an absolutely stationary reflective surface as disclosed in Harding et al. to be workable with moving hot metal strip.

As pointed out by Dr. Müller in his Declaration, whether it is the Harding et al. system, or some other system, and/or a moving hot metal strip measurement system, such systems are not necessarily interchangeable. The fact that the strip is moving presents additional challenges in measuring its flatness that are simply not present in the measurement of a stationary metal panel, as described in Harding et al. Hot metal strips leaving the finishing-stand are frequently subject to the so-called phenomenon known as "fluttering." Here the strip is oscillating up and down in the perpendicular direction to the transport direction as much as

0.5 m. Clearly, no sensible measurement would be possible in this situation, if the strip was reflective. In short, hot metal strips present challenges that are not present in systems involving stationary objects (e.g., Harding et al.) or even systems involving moving, cold metal strips ((Müller Declaration, paragraph 12).

Finally, the fact that the system of measuring stationary objects disclosed in Harding would not have been relevant to measuring the flatness of a moving hot metal strip would have been evident from Harding's own discussion regarding how one would determine what area of a panel one is looking at. In particular, Harding states that

> In order to determine what area on panel 16 one is looking at, several pictures with locations physically noted by an artifact can be used to construct an overlay to analyze the photos (Col. 4, lines 48-58) (emphasis added).

Thus, the system described by Harding et al., requires several pictures to be taken of a single area of a panel. This is necessary in Harding et al. to establish whether the distorted picture that the camera may see is due to the disposition of the panel itself or actually due to a surface defect. Such a system would simply not work when measuring the flatness of a hot metal strip (where, for example, the strip is often moving at 10 and sometimes 20 m/sec. This

alone would have suggested to one of skill in the art the inapplicability of the Harding system to the problem at hand.

Thus, as set forth above, there are numerous reasons why one of ordinary skill in the art would not have considered Harding et al. relevant to the problem of measuring the flatness of a hot moving strip. Simply stated, Harding et al., on the one hand, and Pirlet et al. on the other hand, are not analogous prior art, and one of ordinary skill in the art would not have been motivated to combine these, absent the use of hindsight. For these reasons, Applicants respectfully submit that the claims are allowable over the combination of Harding et al. and Pirlet et al.

The Examiner dismissed the Declaration of Dr. Müller as merely attacking the cited references individually. On the contrary, Dr. Müller's Declaration and the statements set forth therein are, first and foremost, directed to the fundamental question raised by the rejection, and that is, would one of ordinary skill in the art "select the elements from the cited prior art references for combination in the manner claimed." In re Rouffet et al., 149 F.3d 1350, 1357 (Fed. Cir. 1998).

The Federal Circuit has identified three possible sources for a motivation to combine references including: The nature of the problem to be solved, the teachings of the

prior art and the knowledge of persons of ordinary skill in the art. Id. As set forth in the attached Declaration of Dr. Müller, the nature of the problem to be solved, i.e., measuring the flatness of a moving and hot metal strip, is quite different from the problem presented in Harding et al.

Moreover, Dr. Müller, speaking as one of ordinary skill, has identified several reasons why the skilled artisan with knowledge of hot strip mill practice would not have considered Harding et al. The Office has not challenged any of Dr. Müller's conclusions on the merits.

Thus, Applicants respectfully submit the failure of the Office to explain the principle or reason why one of ordinary skill in the art would have been motivated to select the references and combine them, particularly in view of Dr. Müller's many reasons why one would not, cannot support a conclusion of obviousness. Indeed, Applicants respectfully submit that the absence of any meaningful reason as to why one would have been motivated to make the proposed combination, suggests that it is the Office, and not the Applicant, that is viewing the references individually.

The Office also appears to imply that Dr. Müller's Declaration is not persuasive for the reason that it is made "by a person who stands to benefit from the statements made." However, the fact that the Declarant is also the inventor

does not undermine the persuasiveness of the statements made. An inventor's Declaration can certainly be probative. In re Keyes, 214 USPQ 579, 580 (Board of Appeals, 1982). In this instance, the issue being addressed is whether the system of Harding et al. would have been relevant to a system for measuring the flatness of a moving hot metal strip, and Dr. Müller provides several reasons why it would not have been relevant.

B. Claims 11-13 and 15 would Not Have Been Obvious because Pirlet Does Not Disclose Measuring The Flatness of an End Face Coil

In addition to the foregoing, Applicants submit that claims 11-13 and 15 would not have been obvious because neither Pirlet nor Harding disclose or suggest measuring the flatness of an end face coil. When considering methods for measuring the flatness of an end face of a coil, one must keep in mind that the end face of a coil is not simply one single side of a face of a strip. The end face of a coil includes the side surface of one strip coiled together. Very often, coiling the strip results in different line patterns at the point where the different strip sections lie on top of one another. Also, the coil might be coiled in an inexact manner. For example, one coil section may, during rolling, be set down in a different position along the longitudinal axis

of the coil. Thus, the coil end surface is not a plane surface.

One of ordinary skill in the art would expect that interfering shadows of one coil section projected onto the next coil section in the illuminated sections of the projection would make the picture taken by the camera impossible to analyze. This is because analysis would not adequately detect which shadows were caused due to the projection and which shadows were caused due to inexact coiling.

Thus, only with some disclosure or appreciation that such projection methods are applicable to methods for measuring the flatness of an end face of a coil could claims of the present invention be even remotely considered obvious in view of the prior art. However, as set forth above, as the cited documents and those included herewith do not provide such a disclosure, one of ordinary skill in the art would have had no guidance and would have had no reason to believe that applying the projecting methods to the specific technical field would have worked.

Accordingly, reconsideration and allowance of the claims are respectfully requested.

(8) <u>CONCLUSION</u>

For the reasons set forth above, Applicants respectfully submit that the claims 8-15 are now allowable and the decision of the Examiner rejecting these claims should be reversed.

Date: March 23, 2006

Respectfully submitted,

Andrew G. Kolomayets
Registration No. 33,723

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(9) Claim Appendix

1-7. (Canceled)

8. A method for continuously measuring the flatness of a moving hot metal strip, the method comprising projecting a shadow in the form of a line pattern onto said moving hot metal strip, and detecting said line pattern on said moving hot metal strip with a camera.

9. The method of Claim 8, wherein said line pattern detected by said camera is compared continuously by a computer with a reference pattern.

10. The method of Claim 8, wherein said line pattern detected by said camera is used for control of a finishing train.

11. A method for continuously measuring the flatness of an end face of a coil when coiling a metal strip, the method comprising the steps of projecting a shadow in the form of a line pattern onto said end face, and detecting said line pattern on said end face with a camera.

12. The method of Claim 11, wherein said line pattern detected by said camera is compared continuously by a computer with a reference pattern.

13. The method of Claim 11, wherein said line pattern detected by said camera is used for control of a finishing train.

14. A method according to Claim 8, wherein projecting a shadow comprises using a projector to project through a slide.

15. A method according to Claim 11, wherein projecting a shadow comprises using a projector through a slide.

(10) <u>EVIDENCE APPENDIX</u>

Declaration of Dr. Ulrich Müller (Tab A).

(11) <u>RELATED PROCEEDINGS APPENDIX</u>

None.

LAST PAGE

This page is the "last page" and immediately follows pages 1-21 of the Brief. This page is being identified by page number, as indicated below, to aid in identification and consideration if scanned.

PATENT
Attorney Docket No. 0329-0009.01

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Ulrich Müller, et al. Serial No.: 10/677,880 Filed: October 2, 2003 Examiner: Vikkram Bali Art Unit: 2623 For: FLATNESS MEASUREMENT SYSTEM FOR METAL STRIP	**CERTIFICATE OF MAILING BY "EXPRESS MAIL"** "Express Mail" Mailing Label: EV459443455US Date of Deposit: 04/20/2005 I hereby certify that this paper or fee is being deposited with the United States Postal Service "Express Mail Post Office Box Addressee" service under 37 CFR 1.10 on the date indicated above and is addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 NAME: Max Castro (TYPED OR PRINTED) SIGNATURE:

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

DECLARATION OF DR. ULRICH MUELLER

I, Dr. Ulrich Mueller, hereby declare as follows:

1) I am named co-inventor of the invention described and claimed in the above-identified patent application, U.S. Patent Application Serial No. 10/677,880.

2) I am presently employed by Betriebsforschungsinstitut (BFI) VDEh-Institut für angewandte Forschung GmbH as a deputy department manager. I have worked at BFI for 26years, and have over 20years experience in the field of rolling mill control systems.

3) In 1973, I received my Diploma from the Technical University of Clausthal. I also received a doctorate from the Technical University of Clausthal.

4) It is my understanding that the United States Patent and Trademark Office has rejected the claims of the above-identified patent application based on the combination of U.S. Patent No. 5,367,378 to Harding et al. and the paper written by R. Pirlet entitled "A Non-Contact System for Measuring Hot Strip Flatness." It is also my understanding that the Examiner's position is that it would have been obvious to a person of ordinary skill in the art, at the time the invention was made, "to modify the inspection method to use for the measurement of panels, as described in Harding et al., by introducing the method of measuring the shape of the moving hot metal strip, as taught by Pirlet in a non-contact system for measuring the hot strip flatness (Office Action of October 20, 2004, page 3). It appears to be the Examiner's position that both of the cited references are directed to solving the same problem of measuring the metal strip.

5) As one of skill in the art, it is my opinion that, for the reasons discussed below, the two references are not directed to solving the same problem. Thus, I do not believe that it would have been obvious to combine the two cited references or that one of ordinary skill in the art would have been motivated

to do so. In fact, for the reason discussed below, one of ordinary skill would have considered the system in Harding et al. not applicable to the problem presented and solved by the present invention.

6) First, the teaching of Harding et al. is not relevant to our problem of having to measure the flatness of a moving, extremely hot metal strip. That is because unlike the reflective surface in Harding et al., we were faced with a surface which is typically not reflective but, in fact, is hot red/orange in its appearance, as shown in the attached photograph of our system. Because of the intense, non-reflective color of the moving hot metal strip, I believe that one of ordinary skill would not have considered it possible to effectively project line patterns onto the strip and measure the line patterns. Line patterns are based on the idea of projecting an original picture (a grid as in Harding et al. or through a slide as claimed in current claim 14) onto a surface by shining light through the original and thereby creating illuminated areas and non-illuminated areas on the surface (i.e., the line pattern). The shape of the thus created lines is used to analyze the condition of the surface. For this analysis, it is, however, crucial that the line-borders are clearly detectable by the camera and that any distortion to the line-border only stems from surface-deficiencies. Distortions

to the line borders that stem from other causes would make the system unusable.

7. A person of ordinary skill would, to my understanding, not have believed that such a projection of a line pattern onto a hot metal strip would work, as the red-glowing metal strip itself emits light. This leads to the situation where the areas non-illuminated by the light coming from the grid (that is the area that is supposed to be dark in order to create the necessary line border) are not dark but glowing bright red. I believe, that the one of ordinary skill would not have thought the light-gradient between the illuminated and non-illuminated areas to be strong enough to make out a clear line-border and would thus not have considered that such a system could work reliably with red-glowing hot metal strip. It would have been his belief, that the crucial light-gradient would only be made possible by high powered lasers, like the ones already discussed with regard to U.S. Patent No. 5,488,478 to Bullock et al. or in the Pirlet article.

8. Second, hot metal strips of the type that we deal with often contain many irregularities which appear as random darkened areas on the surface of the strip. I believe that this, too, would have had the person of skill in the art consider it difficult to effectively project and measure line patterns onto the hot metal strip. These darker areas are due

to the difference in temperatures that the areas of the metal strip might have, as it leaves the finishing-stand.

9. Thirdly, and perhaps most importantly, the problem with systems that work on reflective surfaces, as described in Harding et al. is that they have to rely on the fact that the panel itself is always in one definite position relative to the grid and the camera with reflective surfaces. The image of the projected grid can only be seen, if the camera is situated in a very specific position, as shown in scenario A of the attached handdrawn sketches. This is due to the fact that with reflective surfaces, the incident angle of light is the same as the angle of reflection. If the complete panel to be analyzed is not in the position assumed, the camera will analyze a reflection that greatly differs from the reflection that comes from a panel in the assumed position. This difference in picture does not, however, stem from surface defects but simply from a shifted panel. Thus, even with panels without surface defects, the system would consider the perfect panel to be faulty, because it is seeing an unexpected picture, as depicted in the scenarios B and C in the attached sketch.

Looking at the scenarios of A1 and B2 of the further attached handdrawn sketches, it also shows, that slight tilts of the panel also lead to scenarios where the system does not work. Taking into account that the strip can be vibrating as it leaves

the finishing-stand, clearly one would not consider a system that only works with an absolutely stationary reflective surface to work with moving hot metal strip.

10. Finally, the fact that the strip is moving presents additional challenges in measuring its flatness that are simply not present in the measurement of a stationary metal panel, as described in Harding et al. Hot metal strips leaving the finishing-stand are frequently subject to the phenomenon so called "fluttering." Here the strip is oscillating up and down in the perpendicular direction to the transport direction up to 0.5 m. Clearly, no sensible measurement would be possible in this situation, if the strip was reflective. Thus, there are multiple reasons, why the one of ordinary skill in the art would not have considered Harding et al. at all relevant for the problem at hand.

11) Harding et al. describes the need to take several pictures from different points in order to measure the flatness of the reflective metal surface (column 4, lines 45-46). This, in fact, is required when one is dealing with reflective surfaces of the type described in Harding et al. This is necessary, in order to establish whether the distorted picture that the camera sees is due to the disposition of the panel itself or actually due to a surface defect which one tries to analyze. We, on the other hand, take a single picture of our

hot metal strip. For this additional reason, I believe that one of ordinary skill would not have considered the system described in Harding et al. as being adaptable to our system, especially if one takes into account that strips of the kind to be analyzed in our system are moving with speeds of 15 to 20 m/sec which means that the second camera shot - as necessary for the method according to Harding et al. - would see a completely different picture than the first shot. Stated more simply, the system according to Harding et al. is only operational with stationary objects.

12) The systems described in Harding et al., and that described in our own application, are not easily interchangeable, and one cannot assume that what works in one system will work in a different system. For example, in our work, we have recently been asked to investigate whether the system described in the above-identified patent application can be used to measure a cold moving strip with a reflective surface, (which in itself shows that the industry with knowledge of Harding et al. recognizes Harding's limited applicability to stationary objects and has not found means to analyze moving reflective surfaces). We have attempted to employ the system described in our application for such measurements but, to date, have been unable to provide an accurate measurement using our system. This is, in part, a result of the different nature of

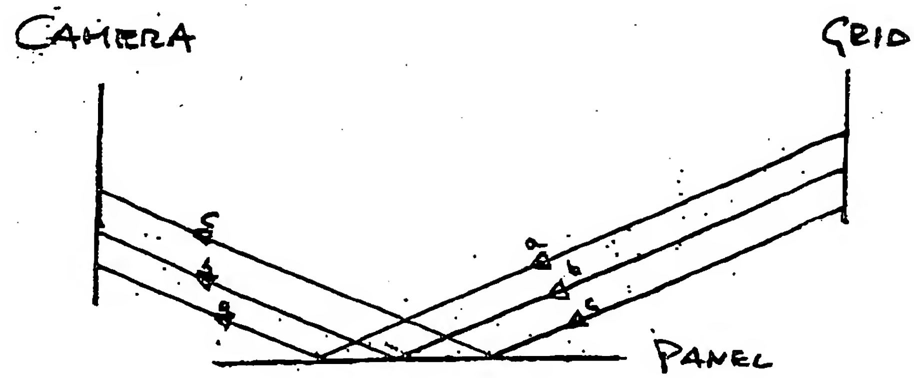
measuring a reflective surface and measuring a flat, hot metal strip, as described in this application. It is for this additional reason that, as one of ordinary skill in the art, I do not believe that the teaching in Harding et al. would have led others of ordinary skill to look to the Harding et al. teaching for the purpose of measuring the flatness of a hot metal strip.

13) I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that the statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 USC 1001 and that such willful false statements may jeopardize the validity of the application or any patents issued thereon.

Ulrich Müller 19 April 2005

Date

SZENARIO A



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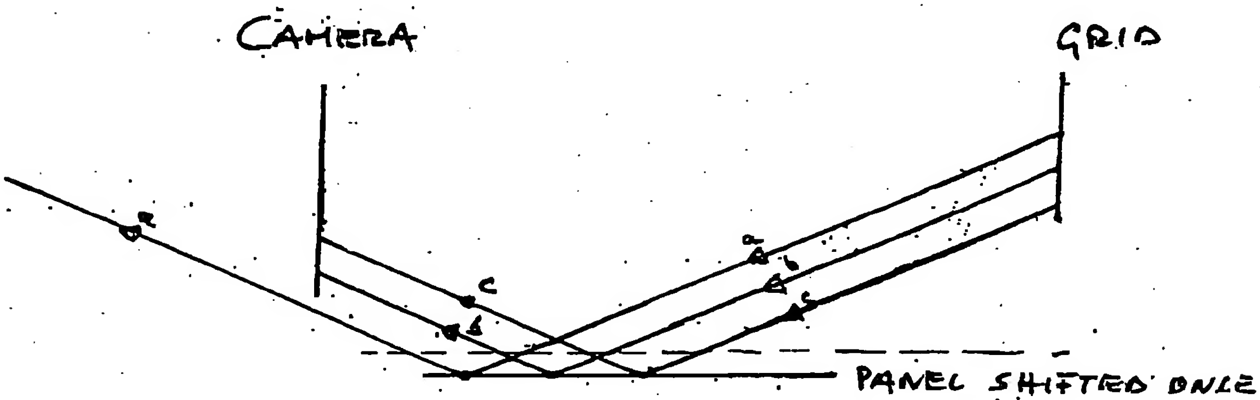

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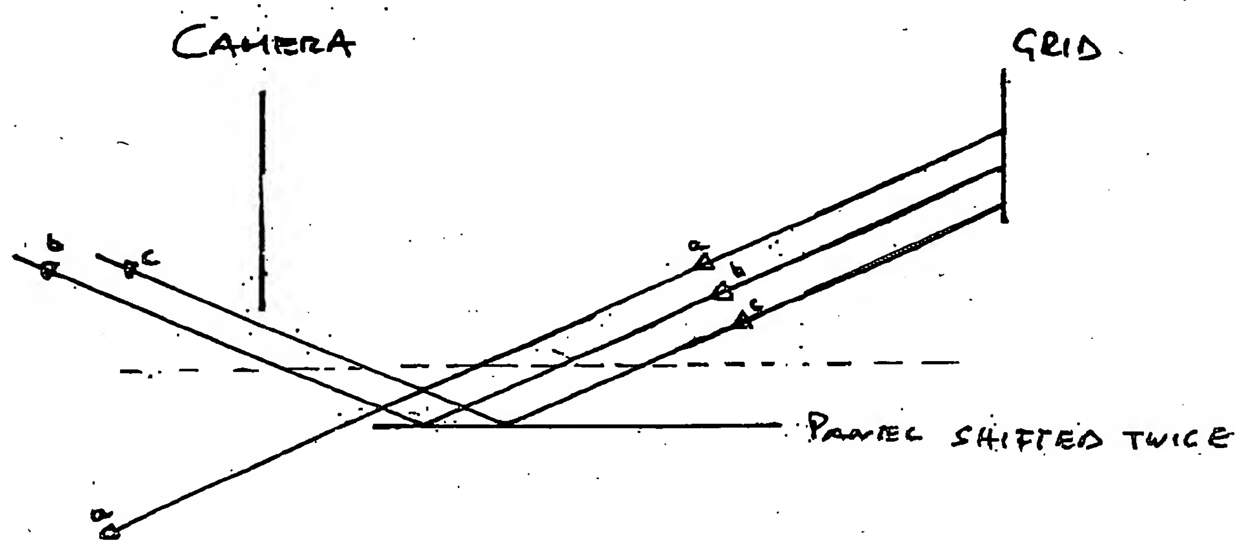
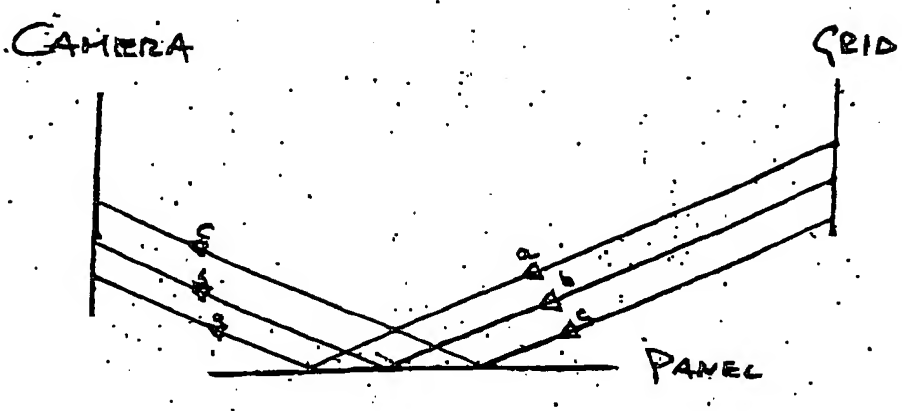


SZENARIO A1



SZENARIO B1